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(71) Applicant
Keith Duell
7 Tormead, Dibden Purlieu, Hythe, Southampton, SO4 5AW, United Kingdom

(72) Inventor
Keith Duell

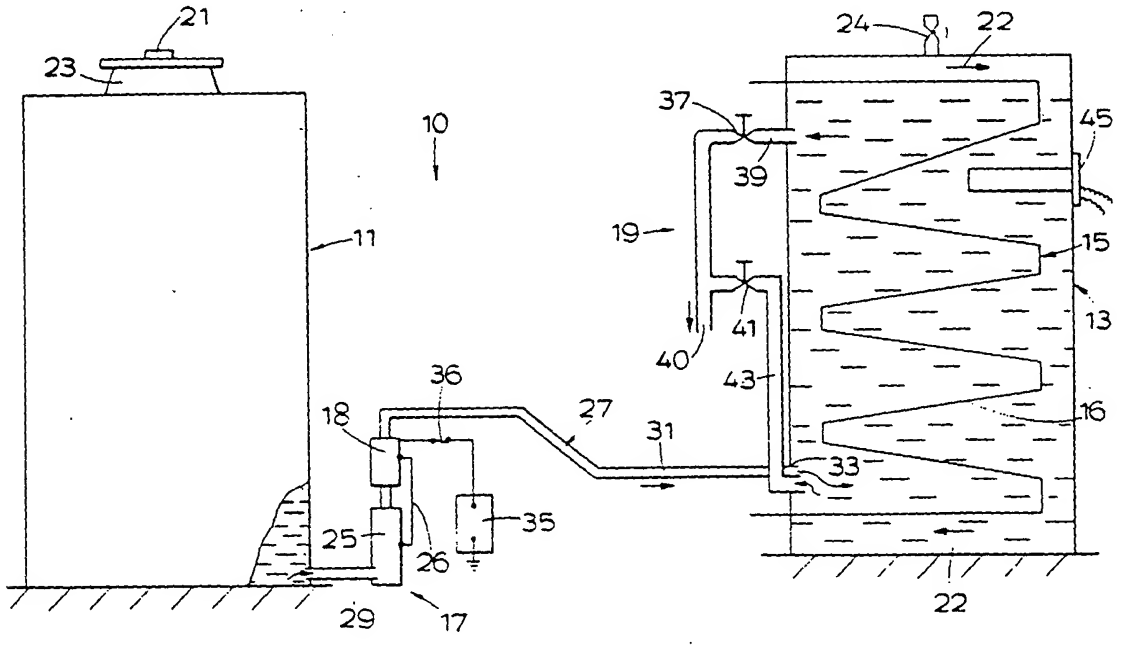
(74) Agent and/or Address for Service
J A Boutland With Barker, Brettell And Duncan
Prudential Buildings, 97-101 Above Bar Street, Southampton, SO9 4GT, United Kingdom

(54) Motor vehicle water supply system

(57) A motor-driven road vehicle is provided with a water supply system 10 which provides a source of hot water for use of the vehicle driver and/or others. The system 10 comprises a first water storage chamber 11, a second pressurised water storage chamber 13, a heat exchanger coil 16 disposed within the chamber 13, water pump means 17, pressure sensitive means 18 operable to active or to deactivate the pump means 17 as pressure in the chamber 13 is or is not below a predetermined value, and manually-operable control valve means 19.

The heat exchanger coil is connected to the engine cooling system of the road vehicle. Additional heat may be provided by an electrically-powered immersion heater 45.

In use, heated water is drawn from the chamber 13 by use of a valve 37 and/or a valve 41. In consequence, pressure falls within the chamber 13 whereupon the pressure sensitive means 18 causes the pump means 17 to replenish the water, by extracting it from the chamber 11.



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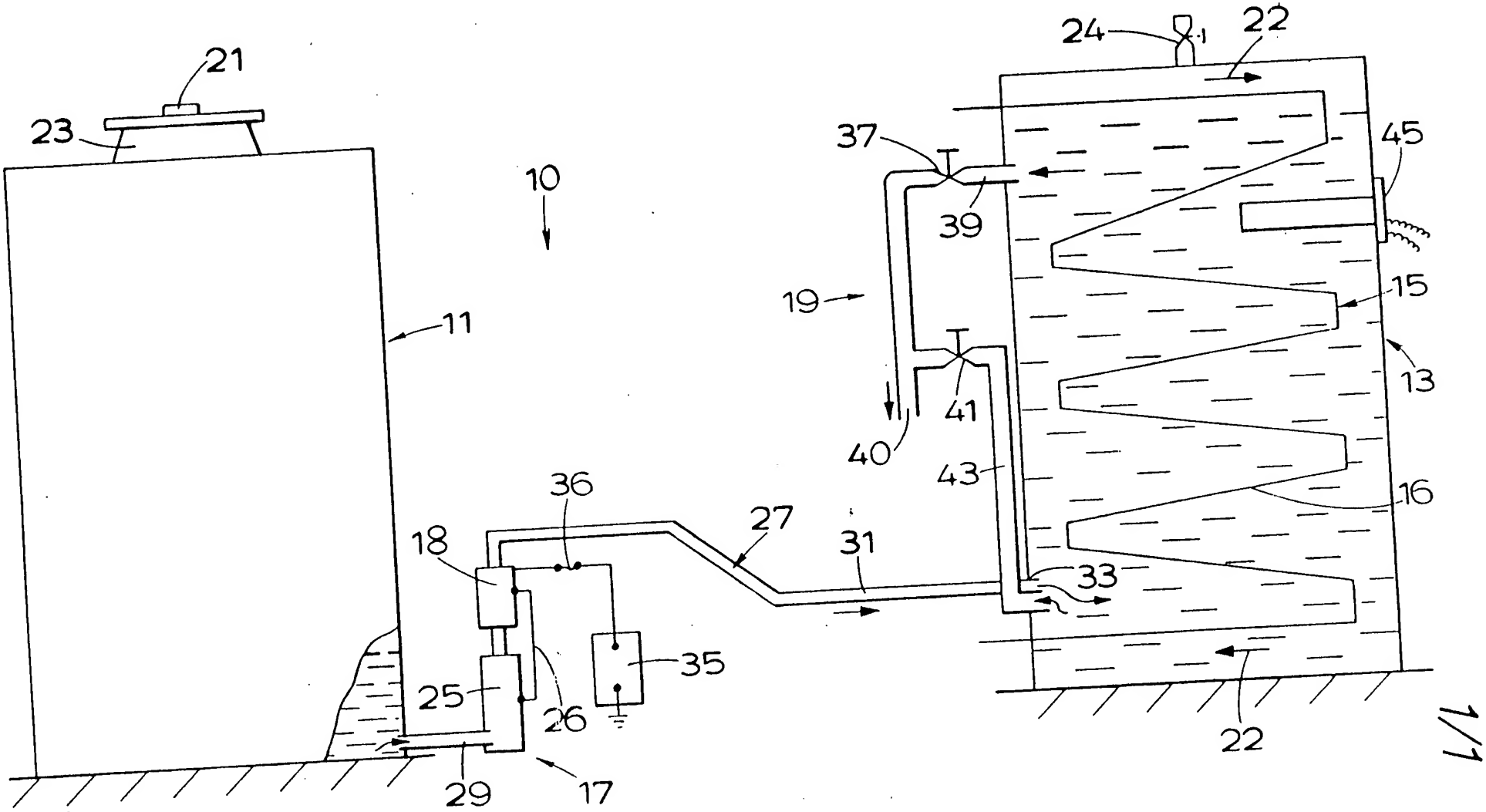
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MOTOR VEHICLE WATER SUPPLY SYSTEM

This invention relates to water supply systems.

The invention arose from the appreciation by the inventor of the need in motor-driven road vehicles, particularly long distance road vehicles, of a source of hot water, for the use of at least the drivers of the vehicles.

According to the invention, a water supply system for incorporation in a motor-driven road vehicle comprises a first water storage chamber, a second water storage chamber, heat exchanger means within the said second chamber for connection to the engine cooling system of the road vehicle, water pump means operable to transfer water from the first to the second chamber, pressure sensitive means operable to activate and to deactivate the water pump means accordingly as the pressure in the second chamber is or is not below a predetermined value, and manually-operable valve means for removal of water from the second chamber.

The said pump means may communicate with the second chamber at a position adjacent the bottom thereof. A second conduit may communicate with the second chamber adjacent the top thereof, and the said valve means may comprise a first manually-operated valve in the said second conduit.

There may be a third conduit which communicates with the second chamber adjacent the bottom thereof, and the said valve means may incorporate a second manually-operated valve in the said third conduit.

The said second and third conduits may be connected downstream from the said first and second manually-operated valves so as to constitute a single outlet from the said second chamber.

A water supply system in accordance with the invention is hereinafter described, by way of example only, with reference to the accompanying single figure, which is a diagrammatic representation of the system.

The water supply system 10 illustrated, which is incorporated in a motor-driven road vehicle (not shown) comprises a first water storage chamber 11, a second water storage chamber 13, a heat exchanger means 15 disposed within the second chamber 13, water pump means 17, pressure sensitive means 18 operable to activate and to deactivate the water pump means 17 as pressure in the second chamber 13 is or is not below a predetermined value, and manually-operable control valve means 19.

The water storage chambers 11 and 13 are storage tanks, the chamber 11 being maintained at atmospheric pressure by means of a valve 21 operable to admit air to the chamber 11 whenever the pressure therein falls below atmospheric. The chamber 11 is for the purpose of storing cold water. To permit the introduction of cold water to the chamber 11, a screw-threaded water filler cap 23 is provided. The valve 21 is incorporated in the cap 23.

The chamber 13 is a pressure chamber capable of withstanding excess pressures of up to 0.70368 Kg/cm^2 (10.0 lb/in^2). An air bleeder valve 24 is provided which is operable to vent the chamber 13 should the pressure within rise above a permitted value.

The heat exchanger means 15 comprises a conduit 16 of coiled form which is connected to the engine cooling system (not shown) of the motor-driven vehicle.

The heat exchanger conduit 16 extends between the upper and lower regions of the second chamber 13. Water pumped from the engine cooling system flows through the conduit 16 in the direction represented by the arrows 22.

Water is transferable from the first chamber 11 to the second chamber 13 by operation of the pump means 17.

The pump means 17 comprises a water pump 25 and conduit means 27 which includes a conduit portion 29 communicating between the pump inlet and the first chamber 11 and a conduit portion 31 communicating between the pump outlet and a position 33 of the chamber 13 adjacent the bottom thereof. The pump 25 is an electrical pump and is operable by an electrical control circuit comprising a battery 35, a fuse 36 and the pressure sensitive means 18. The pressure sensitive means 18 comprises a pressure switch connected in the output of the pump 25.

The pressure switch 18 closes whenever the pressure in the second chamber 13 falls below a predetermined pressure, in this example 0.351534 Kg/cm^2 (10.0 lb/in^2). The pressure switch 18 opens, de-energising the pump 25 by way of a control lead 26, thereby terminating the transfer of cold water from the first chamber 11 to the second chamber 13 when pressure therein is restored to its former level.

In operation, with the second chamber 13 charged with cold water extracted from the first chamber 11 by the pump 25, heat is transferred to that cold water from hot water flowing through the heat exchanger conduit 16.

The water in the second chamber 13 may, by this means, be raised in temperature to perhaps 80°C.

The manually-operable valve means 19, by which heated water may be abstracted from the second chamber 13, comprises a valve 37 disposed in a conduit 39 communicating with the chamber 13 adjacent the upper region thereof. The conduit 39 has an outlet 40 whereby heated water for personal washing and related purposes is obtained.

Upon removal of heated water by opening the valve 37, pressure in the chamber 13 falls. In consequence, the pressure switch 18 closes. The pump 25 is thereby activated, by way of lead 26, causing cold water to be transferred from the first chamber 11 to the second chamber 13 in order to replenish the water in the chamber 13.

The valve means 19 also comprises a valve 41 disposed in a conduit 43 communicating with the chamber 13 adjacent the lower region thereof, where water in the chamber receives a lesser amount of heat from the heat exchanger conduit 16 than that given up to water in the upper region. In consequence, when the valve 41 is opened, cooler water is removed from the chamber 13.

The conduits 39 and 43 may, as shown, be combined downstream of the valves 37 and 41 for the purpose of obtaining water at an intermediate temperature from the common discharge, outlet 40.

In addition to the heat exchanger conduit 16 there may be an electrically-powered immersion heater 45 drawing current from the vehicle electrical generator. ie alternator, by way, perhaps, of the vehicle engine battery.

In practice, cold water storage chamber 11 is substantially larger in volume than the hot water supply chamber 13.

CLAIMS

1. A water supply system for incorporation in a motor-driven road vehicle comprising a first water storage chamber, a second water storage chamber, heat exchanger means within the said second chamber being conduit means for connection to the engine cooling system of the motor vehicle, water pump means operable to transfer water from the first to the second chamber, pressure sensitive means operable to activate and to deactivate the water pump means accordingly as the pressure in the second chamber is or is not below a predetermined value, and manually-operable valve means for removal of water from the second chamber.

2. A water supply system as claimed in Claim 1, wherein the water pump means comprise a water pump and a conduit communicating with the second chamber adjacent the lower region thereof.

3. A water supply system as claimed in Claim 1 or 2, wherein the manually-operable valve means comprise a conduit communicating with the second chamber adjacent the upper region thereof.

4. A water supply system as claimed in Claim 3, wherein the manually-operable valve means further comprise another conduit communicating with the second chamber adjacent the lower region thereof.

5. A water supply system as claimed in Claim 4 wherein the said another conduit is combined with the first-mentioned conduit whereby a common discharge is provided.

6. A water supply system as claimed in any one of Claims 1 to 5, wherein the second chamber is provided with an electrically-powered immersion heater in addition to said heat exchanger means.

7. A motor-driven road vehicle, provided with a water supply system as claimed in any one of Claims 1 to 6, wherein the heat exchanger means is connected to the engine cooling system of the vehicle.

8. A water supply system substantially as hereinbefore described with reference to the accompanying drawing.

9. A motor-driven road vehicle, provided with a water supply system as claimed in Claim 8.

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